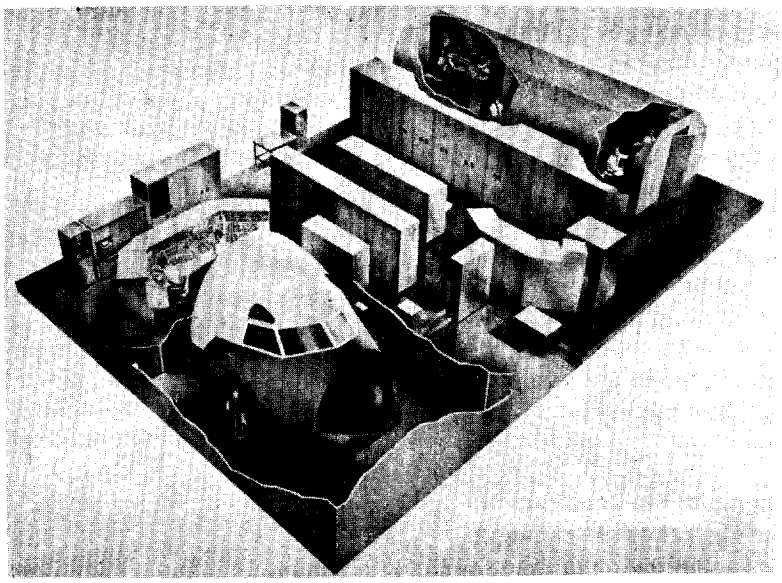

P-3C AIRCRAFT TACTICAL TEAM TRAINER, UPDATE II, DEVICE 2F87C (T)

TRAINING CATEGORY:

AVIATION (Operation Flight/Weapon System)

ORIGINATING AGENCY:

DCNO/AIR

SECURITY CLASSIFICATION:

Device 2F87C (T) is confidential.

INTENDED USE:

The P-3C tactical team trainer shall provide training in initiating and executing corrective actions which shall produce the proper effects on the flight and systems performance. The trainer shall be used to train crew members of the P-3C aircraft in all aspects of individual tasks and for team training.

FUNCTIONAL DESCRIPTION:

The P-3C tactical team trainer shall include a simulation of all normal, emergency, and alternate aircraft systems, including controls, warning devices, and indicators. All mocked up equipment shall be three (3) dimensional replicas and shall be internally illuminated as in actual aircraft.

The 4 Allison T-56-A-14 constant speed axial flow, single spool gas turbine engines installed in the design basis aircraft shall be simulated. Simulation shall include both normal and emergency operation of all associated systems.

The 4 Hamilton Standard 54H60 4-bladed propeller systems installed on the P-3C aircraft shall be simulated, including the propeller governing system.

The effects of up to a 50 knot wind velocity and direction shall be simulated in the trainer for the taxiing, take-off and landing modes, as well as during the airborne mode of operation.

The trainer shall consist of the following major components:

1. The cockpit shell shall house the trainee station. It shall include crew stations for pilot, copilot, and flight engineer. The entrance to the flight compartment shall be from the second floor of the computer area and shall be similar to the entrance of P-3C aircraft. All simulated aircraft instruments and instruments modified for trainer use shall be marked on the outer casing - "For Trainer Use Only." Pilot/copilot shall be able to operate the simulated automatic in-flight, parking and emergency brake system. Simulation of the aircraft brake system shall include parking brake system, brake accumulator system, and accumulator brake pressure gauge systems.

The vertical speed indicator located on the instrument panel shall reflect the aero-dynamic performance of the trainer. Windshield wiper and washer controls shall be mocked up. The windshield heating system shall be simulated to provide the control and light indications available in the cockpit, but without actual heating of the windshield. A simulated oxygen system shall permit trainees to make oxygen checks.

2. Instructor Station - shall be located to the rear of the crew stations. The instructor station shall be provided with a console which includes a minimum of 2 Cathode Ray Tube display systems for monitoring and controlling the training situation. The instructor station shall contain the controls to communicate with the trainees keyboard, controls to set and reset the visual scene and motion system, controls to freeze and unfreeze the device, controls to permit malfunction insertion and malfunction clearing. The status of up to 15 active and 15 timed malfunctions shall be provided.

3. Digital Computer System - shall consist of one or more general purpose computers, interface equipment, peripheral equipment, and all software required to operate a completely integrated system. Output data from the computer shall activate and control the motion system, trainer station, instructor station, and visual display system.

4. Motion System - shall simulate the sensation cues of engine runup, taxiing, braking operation, steering, aircraft rotation, touchdown and the like.

Sounds of engines, propellers, inverters, vibrators, cabin pressurization, landing impact, tire screech, aerodynamic hiss and noise due to flaps in any position and the like that are audible in the P-3C aircraft shall be simulated.

5. Visual System - a computer generated image (CGI) visual system shall be provided. The visual system shall provide a realtime, multi-channel, out-the-window display of the dusk-night visual scene. The system shall provide simulation of the mission gaming area. The mission gaming area will be subdivided into at least 10 task/region environments. Data bases for task/region environments listed below shall be provided:

NAS Brunswick, Maine
NAS Lajes, Azores
NAS Keflavik, Iceland
N. S. Rota, Spain

The system shall be capable of simulating runway surfaces and markings. Taxiway surfaces are required for each active runway.

Simulation of surfaces of vertical aspect and solid 3 dimensional objects shall be provided, (i.e. buildings, bridges, towers, hills, ships, and aircraft). The visual system shall provide the capability to simulate a horizon as a glowing band of yellow- white or orange light whose intensity smoothly decreases with elevation angle above the horizon. A continuous cloud layer with controls for cloud top and cloud bottom shall be provided. When selected, the uneven, irregular nature of the cloud layer lower boundary region (SCUD) shall be simulated.

Under simulated "crash" conditions the visual system shall provide a flashing red display in all windows until the trainer is reset by the instructor.

6. Observer Positions - the trainer station shall be provided with 2 observer positions, from which observers can comfortably view trainee performances. A communication station shall be provided to enable each observer to communicate with instructors.

DIRECTORY OF NAVAL TRAINING DEVICES

PHYSICAL INFORMATION:

ITEM	COLOR
Cabinets	Black
Cabinet Caps	Black
Cabinet Bases	Black
Stairs	Dark Gray
Device Label and Name	Cream
Consoles	Black
Console Panels	Light Gray
Console Base	Black
Console Caps	Black
Lettering on Console Panels	Black

The assembled trainer shall not exceed the volumes specified below.

	FLOOR AREA	CEILING HEIGHT
Cockpit Area	35' x 39'	33'
Computer Area (Two Floors)	22' x 35' (each)	10' (each)
Hydraulic Pump Area	20' x 22'	10'
Model Board Area	20' x 55'	25'
Corridor Area	12' x 100'	10'

ENVIRONMENTAL CHARACTERISTICS:

Heating Cycle	70° ± 2° F
Cooling Cycle	70° ± 2° F
Relative Humidity	50 ± 5%
Minimum Air Velocity	20 Ft. pm
Maximum Air Velocity	50 Ft. pm

INSTALLATION AREA;

A raised flooring covered with carpeted tile, capable of supporting the heaviest equipment rack shall be provided. The raised flooring shall be 1', 6" above and extend over the entire floor area of the trainer excluding the cockpit area, the hydraulic area, and area beneath the Gantry/Model board.

POWER REQUIREMENTS:

The trainer shall be capable of operation from a 120/208 volt, 3-phase, 4-wire, 60 Hz power source. Also 277/480 volt, 3-phase, 4-wire, 60 Hz power for the hydraulic motor pump for the motion system, air conditioning system, and 400 Hz power source.

400 Hz power source shall be furnished by a motor-generator set, and the 50 Hz power source shall be furnished by a solid state system.

REFERENCE PUBLICATIONS: (NOT SUPPLIED)

Naval Training System Center (NAVTRASYSCEN)

68-C-0043-14
Interconnection Design Report for P-3C Weapon System Trainer, Device 2F87 (Tactics)

68-C-0043-24
Installation Inspection Procedures Report for P-3C WST (T)

71-C-0013-1
Training Device Design; Human Factors Requirements in the Technical Approach

Bulletin 40-1
Integrated Logistic Support for Training Devices

Bulletin 301-2
Parts, Nonstandard; Design Selection, Procedures for

TAEG Report 7
Task Analysis of Pilot, Copilot, and Flight Engineer Positions for the P-3C Aircraft

TR-318-5
Final Report Addendum: Application of Dynamic Test Techniques to Weapon System Trainers

PERSONNEL:

Trainees:	Three (3)
Instructors:	Two (2)
Observers:	Two (2)

RELATED TRAINING DEVICES:

2F87A (T)	6930-LL-C00-3226
2F87B (T)	6930-LL-C00-4008

CONTRACT IDENTIFICATION:

Manufactured by The Singer Co., Silver Spring, MD under NAVTRASYSCEN Contract No. N61339-68-C-0043.

LOCAL STOCK NUMBER:

6930-LL-C00-4901